

CLAIMS

1. A method for electrostatically coating an electrically poorly conducting substrate comprising bringing the substrate to a coating station at which it is held substantially electrically isolated from its surroundings adjacent a source of particulate coating material, the substrate and the coating material being held at a potential difference to each other sufficient to coat the exposed surface of the substrate with particles of coating material.

2. A method according to claim 1 in which the substrate is at a potential difference to its surroundings.

3. A method according to claim 1 or 2 in which the electric field between the coating material and the substrate is shaped so that the substrate is in a potential well.

4. A method according to claim 1, 2 or 3 in which at the coating station the substrate is supported by but electrically isolated from an electrically conductive surface.

5. A method according to claim 4 in which the potential difference to earth of the surface and of the coating material are of the same sign.

6. A method according to claim 4 or 5 in which the surface is at the same potential difference to earth as the coating material.

7. A method according to any preceding claim in which the substrate is held at the coating station at a potential difference to earth.

8. A method according to any preceding claim in which substantially the only motive force between the substrate and the

coating material is electrostatic.

9. A method according to any preceding claim in which the substrate is supported, and in electrical contact with an electrode, the substrate being otherwise electrically isolated from its surroundings.

10. A method according to claim 9 in which a plurality of substrates are supported on respective ones of plurality of electrodes electrically isolated from each other and forming part of a support surface.

11. A method according to claim 10 in which the support surface is continuous.

12. A method according to any preceding claim in which the coating material particles are at a potential different to earth.

13. A method according to any preceding claim in which a powdered coating material is used.

14. A method according to claim 13 further comprising bringing the substrate coated with powder to a fusing station where the powder on the substrate is fused to a uniform coating.

15. A method according to claim 14 in which the fusing is by heating.

16. A method according to claim 15 in which the heating is by infra-red radiation.

17. A method according to any of claims 14, 15 and 16 further comprising cooling the fused coating on the substrate.

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18. A method according to any of claims 13 to 17 further comprising, prior to bringing the substrate to the coating station, bringing the substrate to a preconditioning station at which the exposed surface of the substrate is coated with a capture-enhancing liquid.

19. A method according to claim 18 in which the coating carried out at the preconditioning station is electrostatic coating.

20. A method according to claim 18 to 19 in which the capture-enhancing liquid is partially conducting.

21. A method according to any of claims 1 to 12 in which the coating material is liquid.

22. A method according to any preceding claim in which the substrate is carried by a support surface having a plurality of individual locations adapted to receive a substrate and hold it electrically isolated from the remainder of the surface and at a predetermined potential difference to earth.

23. A method according to any preceding claim in which the substrate is held in contact with an electrode at least while it is at the coating station.

24. A continuous method according to any preceding claim in which the substrate is carried by the surface of a rotating drum.

25. A method according to any preceding claim further comprising turning the substrate after application of a coating to a first surface of the substrate and applying a coating to a second surface of the substrate.

26. A coated substrate produced by a method according to any of claims 1 to 25.

27. Apparatus for electrostatically coating an electrically poorly conducting substrate comprising a coating station at which a substrate is substantially electrically isolated from its surroundings adjacent means for supplying particulate coating material; and means for holding a substrate and particulate coating material at a potential difference to each other.

28. Apparatus according to claim 27 comprising means for holding a substrate at a potential difference to its surroundings at the coating station.

29. Apparatus according to claim 27 or 28 further comprising an electric field shaping device adjacent the substrate which shapes the field so that the substrate is in a potential well.

30. Apparatus according to claim 29 in which the electric field shaping device surrounds the substrate.

31. Apparatus according to any of claims 27 to 30 further comprising an electrically conductive support surface for, in use, carrying a substrate at least at the coating station such that the substrate is electrically isolated from the support surface.

32. Apparatus according to claim 31 in which the support surface has a plurality of individual locations adapted to receive a substrate and hold it electrically isolated from the remainder of the support surface and at a predetermined potential difference to earth.

33. Apparatus according to claim 31 or 32 in which the potential difference of the support surface to earth and of the coating material to earth are of the same sign.

34. Apparatus according to claim 31, 32 or 33 comprising means for holding the support surface at the same potential difference

to earth as the coating material.

35. Apparatus according to any of claims 27 to 34 comprising means for holding a substrate at the coating station at a potential difference to earth.

36. Apparatus according to any of claims 27 to 34 further comprising a fusing station downstream of the coating station for fusing a powdered coating material on the substrate to a film.

37. Apparatus according to claim 36 in which the fusing station comprises a heater.

38. Apparatus according to claim 37 in which the heater is a source of infra-red radiation.

39. Apparatus according to claim 34, 37 or 38 further comprising a cooling station downstream of the fusing station.

40. Apparatus according to claim 39 in which the cooling station comprises an air blower.

41. Apparatus according to any of claims 27 to 40 further comprising a preconditioning station for supplying capture-enhancing liquid to the exposed surface of a substrate and a conveyor for conveying the substrate between the preconditioning station and the coating station, the preconditioning station being upstream of the coating station.

42. Apparatus according to claim 41 in which the preconditioning station comprises an electrostatic spray gun for supplying the capture enhancing liquid.

43. Apparatus according to any of claims 27 to 42 comprising an electrode disposed to contact a substrate at the coating station.

44. Apparatus according to claims 43 in which the electrode is a support for the substrate.

45. Apparatus according to claim 44 in which a plurality of the said electrodes form part of a support surface for substrates.

46. Apparatus according to claim 45 in which the support surface is continuous.

47. Apparatus according to claim 45 or 46 in which the support surface is a conveyor disposed between the coating and fusing stations to move the substrate from the coating station to the fusing station.

48. Apparatus according to claim 47 in which the conveyor is also disposed between the fusing and cooling stations to move the substrate from the fusing station to the cooling station.

49. Apparatus according to claim 47 or 48 in which the conveyor is also disposed between the preconditioning and coating stations to move the substrate from the preconditioning station to the coating station.

50. Apparatus according to any of claims 47 to 49 in which the conveyor is the outer surface of a rotating drum having discrete areas electrically isolated from the drum surface for the reception of respective substrates.

51. Apparatus according to claim 50 in which the said areas are depressions in the said surface of the drum.

52. Apparatus according to claim 50 or 51 in which the said areas are each part of a respective moving electrode, each moving electrode extending inside the drum, the drum further comprising a first arcuate stationary electrode so disposed inside the drum

that as one of the said areas passes through the coating station the associated electrode is in electrical contact with the first stationary electrode.

53. Apparatus according to claim 52 in which, in use, the first stationary electrode is, in use, at a potential difference to earth.

54. Apparatus according to claim 52 or 53 further comprising a second arcuate stationary electrode so disposed inside the drum that as one of the said moving electrodes passes through the preconditioning station it is in electrical contact with the second stationary electrode.

55. Apparatus according to claim 54 in which the second stationary electrode is, in use, earthed.

56. Apparatus according to any of claims 50 to 55 comprising a vacuum device for holding the substrates on the surface of the drum.

57. Apparatus according to any of claims 50 to 56 further comprising a second drum and second coating and fusing stations, the second drum being so disposed relative to the first drum that substrates leaving the first drum with a coated surface are transferred onto the second drum with an uncoated surface exposed.

58. Apparatus according to claim 57 further comprising a second preconditioning station adjacent the second drum.

59. A drum for apparatus according to any of claims 50 to 58.

60. A solid pharmaceutical dosage form having one coated face and one uncoated face.

61. A coated pharmaceutical having one coating on one face and

a different coating on the other face.

62. A coated pharmaceutical the surface of one face of which is two or more adjacent different coatings.

63. A coated pharmaceutical according to claim 61 or 62 in which the coatings are of different colours.

64. A coated pharmaceutical according to claim 61, 62 or 63 in which the coatings contain different polymers.